

REMARKS ON FOSSILS OF PERMO-CARBONIFEROUS  
AGE, FROM NORTH-WESTERN AUSTRALIA,  
IN THE MACLEAY MUSEUM.

BY R. ETHERIDGE, JUNR.

PALEONTOLOGIST TO THE AUSTRALIAN MUSEUM, AND GEOLOGICAL  
SURVEY OF NEW SOUTH WALES.

(Plate xvii.)

*Introduction.*—At a meeting of this Society, held in April, 1888, the Hon. W. Macleay exhibited some fossils from the neighbourhood of Derby, North-western Australia. They are contained in a sandy ferruginous rock, and are said by Mr. Froggatt, who collected the specimens, to come from a small area mapped by the late Mr. E. T. Hardman,\* as a portion of his Pindan Sands. The position indicated by the collector on the chart in question coincides with a portion of Hardman's Pindan Group. The latter regarded these deposits as of Tertiary age, and distinctly states that they proved to him unfossiliferous.

Great, therefore, was my surprise to find the organic remains exhibited clearly of a Carboniferous facies. Mr. Macleay was kind enough to allow me to have the loan of the specimens in question, with others from neighbouring localities, in the latter case unquestionably from the great Carboniferous area of the Napier Range, as mapped by Mr. Hardman, and obtained by Mr. Froggatt during the same visit. The full list of localities is as follows :—

---

\* First and Second Reports on the Geology of the Kimberley District, Western Australia, by Edward T. Hardman. *W. Australia Legislative Council Papers*, 1884, No. 31 ; *Ibid.* 1885, No. 34. Perth, 1884-85 (Government Printer).

- (1) Ironstone Ridge, twenty-five miles south-east of Yeeda Station, on the Fitzroy River.
- (2) Mount Marmion, near the junction of the Lennard and Meda Rivers.
- (3) Mount North Creek, Napier Range.
- (4) Lennard River Gorge, Napier Range.
- (5) Barrier Range Homestead, Napier Range.
- (6) Oscar Range, north-east side.

Before proceeding to a description of the organic remains, a short sketch of the Pindan Sands and of the recognised Carboniferous beds, extracted from Mr. Hardman's Reports,\* will not be out of place.

(1) The Pindan Sands and Gravels are the youngest of the Geological formations in the Derby area, excepting, of course, recent alluvial deposits, and were provisionally called by Hardman, Pliocene. They were termed "Pindan"—"from principally occurring in the thickly wooded undulating country termed by the natives 'pindan.'" These beds consist of reddish sands with pea-like nodules of ironstone, gravels, coarse conglomerate, grits and sandstones, the result of the consolidation of detrital deposits by carbonate of lime, or ferruginous material. There are no good sections, but these beds are known to be from twenty to thirty feet thick. About ten miles south of the Yeeda Station where they attain this thickness, these sands and gravels rest on "coarse sandstone, probably of Carboniferous age." No fossils were found in the Pindan beds by Mr. Hardman, "but there can be little question that they are of comparatively recent age. I have classified them provisionally as belonging to the Pliocene period."† Mr. Hardman further added that thick beds of consolidated ironstone conglomerate were associated with the sands and gravels in places, often assuming the form of low, flat-topped, and conical hills.‡

---

\* *Op. cit.* pp. 7 & 9 and 14 & 15, respectively.

† First Report, 1884, No. 31, p. 8.

‡ Second Report, 1885, No. 34, p. 14.

With regard to the area occupied by these rocks, it is a considerable one. Starting from Roebuck Bay on the west, a narrow band has been traced eastward to the mouth of the Fitzroy River in King Sound, extending north-westwards to and beyond the mouths of the May and Meda Rivers. Thence towards the south-west the Pindan Sands and Gravels occupy the whole of the country between the Fitzroy and Lennard Rivers as far as the Napier, Oscar, and Prince Leopold Ranges, which are composed of Carboniferous limestone and metamorphic rocks. Throughout this area are dotted the remains of a Carboniferous formation—the division (*b*) of the next paragraph—as isolated hills of sandstones, grits and conglomerates,\* which apparently crop up through the Pindan beds.

(2) The Carboniferous Formation, as recognised by Mr. Hardman, occupies an immense area in the Kimberley district, and consists of two subdivisions—(*a*) an upper or Sandstone Series, and (*b*) a lower or Limestone Group. The former is a yellowish-reddish freestone, and of it many of the most prominent mountain ranges are formed, such as the Grant Ranges, the St. George Ranges, and Mount Anderson. “It may reasonably be asserted that this sandstone formation is considerably over 1000 feet in thickness.” Again, the author adds: “And although in great part hidden by the newer deposits described above, it is certain that it extends from near the sea-coast, as at Roebuck Bay, for a distance of 190 miles into the interior. . . . Numerous exposures of the sandstone rocks are seen to emerge from the alluvial and pindan coverings.” In the Lennard River area, Carboniferous plants were found in these beds, but no marine fossils.† On the contrary, on the Fitzroy River the sandstones proved very fossiliferous, the organic remains, as listed by Mr. Hardman, being characteristic Carboniferous Limestone species.‡ The second subdivision (*b*), or Carboniferous Limestone in the

---

\* First Report, 1884, No. 31, map.

† First Report, 1884, No. 31, p. 8.

‡ Second Report, 1885, No. 34, p. 16.

Kimberley district, is of large extent, and in it are comprised Nos. 2-6 of the above localities. It is a light-coloured magnesian limestone interbedded with thick layers of shale, and thin arenaceous bands usually fossiliferous, the list given by Hardman being well-known Carboniferous Limestone species. It comprises within its area the Napier, Hull, Rough, Oscar, and other ranges.\* The sum of Mr. Hardman's explorations went to show that "there are wide-spread deposits of Carboniferous rocks in Western Australia, although, even within the last few years, this has been doubted."†

We may now consider the localities yielding the two sets of fossils *seriatim*.

*Ironstone Ridge and its Fossils.*—From this locality Mr. Froggatt has collected a sandy ironstone crammed with fossils, which weather out in a peculiar state of preservation, and from their crowded nature it is difficult to sufficiently individualise specimens for description. Mr. Froggatt informs me that this ridge is about seven miles long, and from thirty to forty feet above the surrounding country. It is composed of horizontally bedded ironstone. The organic remains are essentially Permo-Carboniferous in age, answering to those of our Lower and Upper Marine beds in the New South Wales coal-bearing series. Ironstone Ridge is not shown on Hardman's map, but other parallel, and most probably similar, ridges are near, such as Grant Range and Mount Anderson, the latter being described as composed of "red and white sandstone, with flaggy ironstone on the summit." These ridges evidently crop through the Pindan Sands which were deposited round them, and it is therefore easy to understand that where not specially marked on the map they might be mistaken for a portion of the Pindan Series.

The following are the species discernible:—

---

\* First Report, 1884, No. 31, p. 9.

† Second Report, 1885, No. 34, p. 17.

## BRACHIOPODA.

Genus *PRODUCTUS*, *J. Sowerby*.*PRODUCTUS BRACHYTHÆRUS*, *G. B. Sowerby*.

*P. brachythærus*, G. B. Sby., in Darwin's Geol. Obs. Volc. Islands, 1844, p. 158; Morris, in Strzelecki's Phys. Descrip. N. S. Wales, &c., 1845, p. 284, t. 14, f. 4<sup>c</sup> (*non*. f. 4<sup>b</sup>).

*Obs.*—Both a ventral and dorsal valve are present which appear to represent this protean shell. The dorsal valve is of a much more quadrate shape than the ventral, and belonged to a larger individual. It is covered by closely set spine bases, which both on this and on the ventral valve forcibly remind one of D'Orbigny's figure of this species in Dumont D'Urville's work.\* The ventral valve also has an unmistakable resemblance to the forms figured by Dr. Waagen as *Productus Abichi* and *P. serialis*.† This resemblance lies in the elongated tear-like spines distributed over the surface and the median sulcus. I have seen a similar variety from Queensland.

*P. brachythærus* is widely distributed throughout the marine beds of the Coal Measures of N. S. Wales, Queensland, and Tasmania.

## PELECYPODA.

Genus *AVICULOPECTEN*, *McCoy*.*AVICULOPECTEN TENUICOLLIS*, *Dana, sp.*

*Pecten tenuicollis*, Dana, in Wilkes U.S. Explor. Exped. Vol. X. Geol. p. 705, Atlas, t. 9, f. 7.

*Aviculopecten tenuicollis*, Etheridge fil., Cat. Australian Foss. 1878, p. 67.

---

\* Voy. au Pole Sud, &c. Géologie, Atlas, t. 9, f. 6 and 7.

† Pal. Indica (Salt Range Foss.), 1884, I. pt. 4, fasc. 4, t. 74, f. 1-7, f. 8.

*Sp. char.*—Shell of median size, practically equilateral, higher than wide, hinge line apparently as wide as the shell; valve, seemingly the right, faintly convex, with rather large triangular ears, the anterior slope abrupt and steep; umbo well marked and prominent; surface bearing from twenty to twenty-two radiately curved, coarse, or rough-looking entire costæ, with a smaller interpolated rib separating each pair, and hardly reaching the umbo; the whole crossed by growth laminae, the primary costæ apparently becoming spinous at the points of intersection.

*Obs.*—The principal characters of this species are its shape, the number and arrangement of the costæ, and the steep anterior slope above the anterior ear. On the whole, it appears to correspond with the above little-recognised species, but which, I have reason to believe, is much more common in the Permo-Carboniferous beds of N. S. Wales than is generally supposed.

Genus PETERINEA, Goldfuss.

PTERINEA MACROPTERA, Morris.\*

*P. macroptera*, Morris, in Strzelecki's Phys. Descrip. N. S. Wales, &c., 1845, p. 276, t. 13, f. 2 & 3.

*Obs.*—A single example, much defaced by a peculiar fused or semi-enamelled appearance common to most of the fossils from Ironstone Ridge, possesses many of the characters of this species, such as the convex body, large posterior wing, coarse concentric rugæ, and well-marked ribs. The anterior margin, however, is rather defective, and in consequence the characteristic curve of the projecting anterior end is not visible. I think it may be regarded as a small individual of this species. It measures 2 inches by  $1\frac{1}{4}$ .

---

\* This species has no real relation to the genus *Pterinea* as now restricted. It will shortly be published by the writer as the type of a new genus *Merismopteria*.

Genus PARALLELODON, *Meek and Worthen*.

PARALLELODON SUBARGUTA, *De Koninck*.

*Palæarca subarguta*, De Koninck, Foss. Pal. Nouv. Galles du Sud, 1877, pt. 3, p. 287, Atlas, t. 16, f. 8, 8<sup>a</sup>.

*Obs.*—Several small shells appear to correspond with De Koninck's description of this species, but I am unable to compare the interior characters. The shell is suboval, with a rather obliquely truncated posterior end, an inflated body, inconspicuous umbones, and rather distant growth laminæ.

Genus EDMONDIA, *De Koninck*.

*Obs.*—A single valve, much embedded in matrix, may possibly belong to this genus. It is short and rotund, and has the general outward appearance of the *Edmondia*. The concentric ornament of the shell is, however, rather coarse for this genus, and reminds us rather of that of *Pachydomus*.

## GASTEROPODA.

Genus MOURLONIA, *De Koninck*.

MOURLONIA HUMILIS, *De Koninck*.

*Pleurotomaria humilis*, De Koninck, Foss. Pal. Nouv. Galles du Sud, 1877, pt. 3, p. 325, Atlas, t. 23, f. 14.

*Sp. char.*—Shell depressed conical, of five or six whorls; the body whorl enlarging but slowly until near the mouth; band moderately wide but not deep, with thread-like bounding carinæ, becoming quite sutural on the older whorls; inner lip a little reflected; umbilicus small.

*Obs.*—*Mourlonia* is a conical or discoid section of the older genus *Pleurotomaria*, usually with a large and deep umbilicus. The band is persistent, placed near the suture, in the form of a groove, and bounded by two keels. The present shell fulfils all these conditions, except that the umbilicus is small.



The portion of a shell figured by De Koninck under the above name closely resembles the specimens from north-west Australia, the form being very close indeed, and the appearance of the band identical.

Genus EUPHEMUS, McCoy.

EUPHEMUS ORBIGNII, Portlock, var.

*Bellerophon d'Orbignii*, Portlock, Geol. Report, Londonderry, &c., 1844, p. 401, t. 29, f. 12.

*Euphemus d'Orbignii*, de Koninck, Faune Calc. Carb. Belgique, 1883, pt. 4, p. 156, t. 42, f. 10-12; t. 42<sup>bis</sup>, f. 5-7; t. 43, f. 9-12.

*Obs.*—By far the commonest shell amongst the Ironstone Ridge fossils is a *Bellerophon* of the group *Euphemus*. In the present altered state of the specimens I cannot distinguish it from the above species. The shell is globular, with a reniform aperture, devoid of a keel, covered with distinct and separate spiral ridges, which are obliterated on the back of the youngest portion of the body whorl, whilst the umbilicus is very small and pit-like.

Although to some extent resembling the allied species *E. Urei*, Fleming, sp., the discernible characters are, on the whole, more those of Portlock's shell.

Associated with the individuals of this species are a few others on which faint traces of transverse decussating striae are visible, and one exhibits a tendency to a reflected callous inner lip. It is possible that these may be distinct from those referred to *E. Orbignii*.

*Mount Marmion, with its Fossils.*—The patch of which this hill forms a portion is described by Mr. Hardman as formed of "hard sandstone, ironstone, and grits," and is an elongated outcrop of strata surrounded by Pindan beds, and the alluvial matter of the above rivers. By the colouring of the map this is certainly a part of Hardman's Upper or Sandstone Series. The hill,



Mr. Froggatt says, is flat-topped, and consists of ironstone, which is to some extent in accord with the former description. The fossils were obtained from a calcareous sandstone on a small spur running out from the foot of the hill.

The fossils from this locality are exceedingly interesting, both from the fact of their coming from an horizon where only plants had been previously observed, and also from their close correspondence with others from a fossiliferous locality further to the south in Western Australia. The species are :—

### ACTINOZOA.

#### Genus STENOPORA, *Lonsdale*.

*Obs.*—Several fragments of a Monticuliporid coral with wrinkled corallites is present in one of the blocks, but they are too closely embedded to enable a microscopic examination to be made. Sections prepared for the microscope display the features of *Stenopora* in the presence of the moniliform walls of that genus. The corallum appears to have been that of a delicate branching-lobate species, the branches having a width of three millimètres, but immediately before bifurcation the width is increased to six millimètres. The corallites in the axial portion of the corallum are polygonal, with delicate walls.

#### Genus EVACTINOPORA, *Meek and Worthen*.

*Obs.*—This genus has previously been recorded from Western Australia by Mr. W. H. Hudleston, who described two species from the Gascoyne Range, viz., *Evactinopora crucialis* and *E. dendroidea*. With regard to the specific separation of these I have some doubt, but amongst Mr. Macleay's specimens is an example partaking of the characters of that called *E. crucialis*.

The specimens originally consisted of the two opposing sides of one of the rays of the shuttle-shaped corallum seen on the weathered surface of the matrix. The structure is very badly

preserved, and adds nothing to that already known. The tubes and superimposed layers are visible, but the dividing lamina separating the two halves of the ray is not so.

The occurrence of *Evactinopora* is interesting as furnishing a fossil in common between the Mount Marmion and Gascoyne beds.

## BRACHIOPODA.

Genus SPIRIFERA, *J. Sowerby.*

*Obs.*—Two species of this genus are present in the Mount Marmion gatherings. The first is represented by fragments only, clearly those of a very large species, evenly and finely costate. One of the pieces is three and a quarter inches in depth from the hinge towards the front. Of the second species only one specimen is present, and although differing from the typical figures \* must, I think, be referred to *Spirifera tasmaniensis*. It is a ventral valve, bearing six principal radiating costæ, three on each side the sinus. These, as well as the valleys between them, are traversed by fine and much smaller subsidiary ribs, and there are traces of transverse or concentric laminae. The sinus, which is wide and open, likewise bears similar riblets. The general form of the shell is transversely oval.

Genus ATHYRIS, *McCoy.*

ATHYRIS MACLEAYANA, *sp. nov.*

*Sp. char.*—Shell circular, or transversely oval in outline, but usually the former, plano-convex, or at times slightly concavo-convex; the dorsal valve always convex, the ventral valve flat or slightly concave; the lateral margins are in the same plane with the hinge line, but the front is to some extent sinuated. Ventral valve flat as a rule, and very shallow, with an inconspicuous horizontal and semi-truncate umbo, but in no degree overhanging the hinge line; foramen small, circular, opening upwards, but

---

\* Strzelecki's Phys. Descrip. N.S. Wales, &c., 1845, t. xv.

sometimes a little oblique ; sinus very faintly shown on the surface of the valve, but indicated by a forward extension of the front margin. Dorsal valve moderately convex, evenly rounded in outline, with little or no distinction into fold and flanks ; umbonal region far more marked than in the ventral valve. Surface of both valves with coarse, concentric, roughened laminae.

*Obs.*—A very peculiar form of *Athyris*, from the persistent shallowness of the united valves, especially of the ventral. Ordinarily in this genus the valves are equally convex, or the ventral valve is the more so, the perforated umbo of the latter overhanging that of the dorsal valve. There is also a sinus in the ventral, and a fold more or less developed in the dorsal. In *A. Macleayana* some of these characters are reversed, thus :—the ventral valve is almost flat, except just at the front margin, the latter being bent upwards, and so representing the sinus. There is no fold in the dorsal valve, but it is moderately convex, and there is a sinuated front margin to some extent. The umbo of the ventral valve does not curve over that of the dorsal as in most species of *Athyris* ; but, on the contrary, what little umbo there is to that valve is to some extent truncated, and the foramen is practically at right angles to the hinge line, instead of opening in the same plane. From this arrangement the foramen appears to open upwards, and is inconspicuous. In other words, the ventral valve fits on to and against the dorsal ; and when the united valves are held in a direct line, and on the same level with the eye, from the dorsal side the foramen is not visible. These characters are constant in all specimens examined by me, and are so contrary to the general features in *Athyris* that I feel obliged to separate this curious shell as a distinct species. It affords me, therefore, much pleasure in associating with it the name of Mr. Macleay, to whom I am indebted for an opportunity of describing these interesting fossils.

In one or two places the appearance of the concentric surface laminae would lead to the belief that they projected as separate spines, after the manner of *Athyris Roysii*, Lev.

Genus CYRTINA, *Davidson*.CYRTINA CARBONARIA, *McCoy*, var. AUSTRALASICA, *var. nov.**Pentamerus carbonarius*, *McCoy*, Ann. Mag. Nat. Hist. 1852, X. p. 426.*Pentamerus carbonarius*, *McCoy*, Brit. Pal. Foss. 1855, fas. 3, p. 442, t. 3d, f. 12-18*Cyrtina* (?) *carbonarius*, *Davidson*, Mon. Brit. Carb. Brach. 1858, pt. 2, p. 71, t. 15, f. 5-14.

*Sp. char.*—Shell elongately oval, longer than wide, constant in shape, straight-sided, rough. Valves bi-convex, or in some cases nearly plano-convex, the ventral valve being much arched. Hinge shorter than the width of the shell. Ventral valve inflated, very convex; beak strongly incurved, overhanging the area which is concave, broad, and wide; sinus well marked, but narrow, and more or less angular; fissure large. Dorsal valve either nearly flat, or slightly convex; mesial fold low; umbonal region flattened from above. In the interior the septum of the ventral valve is more than two-thirds its entire length. Surface of the ventral valve rugged, bearing a few (four or five) thick, coarse, hardly radiate and prominent arched ribs, but usually indistinctly sub-divided, or split, especially the pair bounding the sinus, and all separated by angular interspaces; the bottom of the sinus occupied by a single rib.

*Obs.*—This truly British Carboniferous type is another important form in the West Australian extinct fauna, and is exceedingly like the shell found in the Northern Hemisphere, but possesses a greater degree of regularity and less variation. It resembles the later figures of *Davidson*, rather than the earlier ones of *McCoy*. Although the genus has before been recorded from New South Wales, I am not aware that this specific type has been met with. The oval, almost egg-shaped outline, and coarse angular ribs give the shell a very marked appearance.

The septum of the ventral valve, when exposed by fracture, is well shown, and is narrower in proportion than that of *C. carbonaria*, and without its abrupt forward termination, the decrease being much more gradual, and the inner ridge more or less sigmoidal. The dental plates are also shorter, and do not graduate into the septum as in *C. carbonaria*.

McCoy describes the shell as punctate, but Davidson makes no remark on the subject. In the present specimens it is impunctate. The interior details of the dorsal valve are wanting, and in consequence it is impossible to throw any further light on its relation to *Pentamerus* than the late Dr. Davidson did.

#### Genus PRODUCTUS, *J. Sowerby*.

*Obs.*—It is always unfortunate when the palæontological appetite is incited by promising material of a limited nature. Such is the case with the dorsal valve of a large *Productus*, measuring  $3 \times 3\frac{1}{4}$  inches. The interior is exposed, displaying a large and prominent septum, and a remarkably straight hinge line. From the inner contour of the valve it is quite apparent that the outer was flatly concave. The dendritic adductor impressions are well shown, but still more remarkable are the deep long channels of the spine bases, visible not only on the sides, but over the general front surface of the valve. It is difficult, and somewhat hazardous to speak as to specific identity on such a specimen as this, but it may be *P. subquadratus*, Morris, or *P. scabriculus*. The former is met with in the rocks of the Mount Britton gold-field, North Queensland, but as a rule the dorsal valves are deeper and not so wide.

### PELECYPODA.

#### Genus PACHYDOMUS, *Morris*.

*Obs.*—The greater portion of the right valve of a species allied to *Pachydomus globosus*, Sby., sp., but probably possessing a smoother shell. As regards size, its dimensions are small when

compared with the above massive species, which is the type of the genus. *Pachydomus* is exceedingly characteristic of the Permo-Carboniferous beds in Eastern Australia.

#### NAPIER RANGE LOCALITIES.

*Mount North Creek.*—At this locality, a creek running into the Lennard, a white and red streaky limestone was collected. It contains the indistinct remains of shells; one appears to be a Brachiopod, perhaps even a *Spirifera*, otherwise it is not nameable.

*Lennard River Gorge.*—A coarse siliceous and micaceous grit, forming "sandstone bars" in the limestone bed, contains a univalve very near to *Straparollus*. Three whorls are visible, without ornament or other distinguishing feature.

Another block contains very small valves of a Brachiopod, with the general outline of the ventral valve of *Rhynchonella pleurodon*; and another shell with much coarser and more obtuse ribs, with a punctate shell structure. The latter may be either *Retzia* or *Spiriferina*.

A third hand-specimen of siliceous grit exhibits six corallites of a medium-sized Rugose coral protruding from its surface, and partly seen in section, grouped together, but there is no evidence to show that they were fasciculately united. The corallites are circular, with about twenty simple septa projecting into the calices for about two-thirds of their width. The septa converge towards the centre and partially unite, leaving a small tabulate median area. The interseptal loculi are sparsely subdivided by dissepiments, becoming rather closer towards the middle of the corallum.

The general facies of this coral is to some extent that of *Diphyphyllum*, and to some that of *Zaphrentis*. In the absence of additional material for extended microscopic examination, it is provisionally referred to the former.



*Conclusion.*—It has been shown that throughout the Pindan Sands and Gravels, there protrude isolated hills and ridges, which were believed by Hardman, from their associated fossil plants, to be Carboniferous. Ironstone Ridge is evidently a similar hill, and not a portion of the Pindan Series at all, the latter resting on the flanks and filling up the hollows between the Carboniferous prominences. This view is, I believe, borne out by an expression of Hardman's, to the effect that "about ten miles south of the Yeeda station it" (*i.e.*, the Pindan,) "is 30 feet thick, and rests on coarse sandstone, probably of Carboniferous age."\* Here we have the sandstone forming the bed-rock, and it is of course possible that it may extend under the Pindan deposits, where denuded away before their deposition. That the fossiliferous beds at Ironstone Ridge form a portion of the Upper or Sandstone Series, is again borne out by the fact that further south in the Fitzroy district, the place of the plants in this sandstone is taken by a copious marine fauna.† This point is an exceedingly interesting one, for again further south, a similar fauna has been shown to exist in the basin of the Gascoyne River, by Mr. W. H. Hudleston,‡ the fossils of the two areas having a close resemblance to one another.

As regards Mount Marmion, we have here a repetition of what takes place in the Fitzroy River district, the appearance of a marine fauna, in beds forming a portion of Hardman's Upper or Sandstone Series.

The conclusions which may be drawn from a study of these fossils from near Derby are briefly the following:—

- (1) The Pindan beds may still, for all that is known to the contrary, be regarded as of Tertiary age.
- (2) The Ironstone-ridge at Yeeda station cannot be regarded as of the age of the Pindan Series, but is of a similar Carboniferous facies to Mount Marmion, &c.

---

\* 1st Report, 1884, No. 31, p. 8.

† 2nd Report, 1885, No. 34, p. 16.

‡ Quart. Journ. Geol. Soc., 1883, XXXIX. p. 582.



- (3) The Upper or Sandstone Series of Hardman in the Lennard and Fitzroy districts is probably characterised by a fauna as well as a flora.
- (4) The fauna in question shows a more general similarity to that of the Permo-Carboniferous formation of Eastern Australia and Tasmania, than it does to any other fossiliferous group of rocks.

---

#### EXPLANATION OF PLATE XVII.

##### *Athyris Macleayana*, sp.nov.

- Fig. 1. View of the flattened ventral valve showing foramen.
- Fig. 2. View of convex dorsal view.
- Fig. 3. Side view showing line of union of the valves, relative convexity, &c.
- Fig. 4. The hinge with united valves, foramen, &c.
- Fig. 5. A dorsal valve, decorticated, with the shelly spires visible on the right hand side.

##### *Cyrtina carbonaria*, McCoy, var. *australasica*, var.nov.

- Fig. 6. View of a ventral valve of a large specimen, defective about the umbonal region.
- Fig. 7. Side view of another example, showing relative convexity of the ventral valve.
- Fig. 8. Fractured ventral valve with the large septum.

(The figures are all of the natural size.)